Learning Theory Summary

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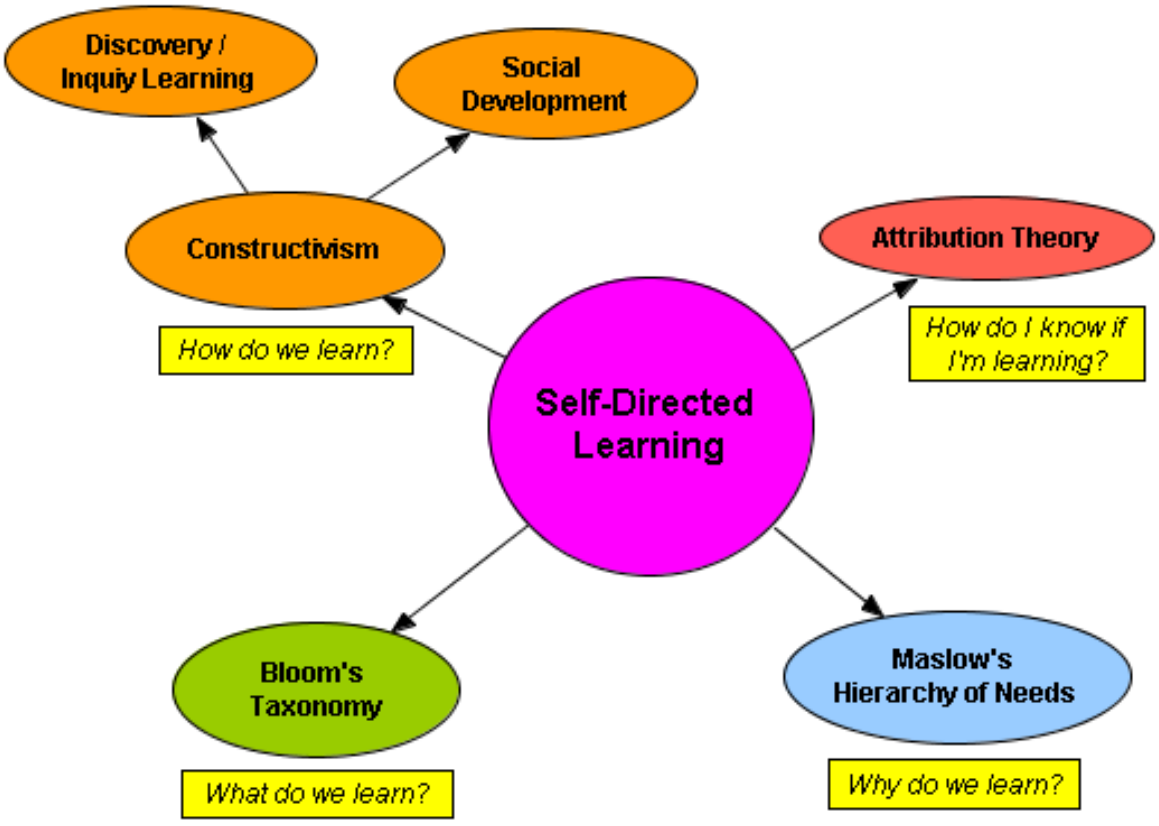
Jan. 13/2014

Herein are contained 5 theories which are inter-related by the common theme of self-motivated learning. They are connected by themes visualized in the following diagram:



The goal of this summary is to show how all of these concepts can be applied to teaching mathematics. The questions in yellow are what a high-order intrapersonal thinker or existentialist student might ask themselves, and are the questions that a teacher should seek to provide answers for by considering and employing the theories connected to them.

Discovery / Inquiry Learning

This theory describes the idea that students are more likely to retain information and find greater degrees of intrinsic motivation if they are engaged in self-directed "inquiry"-based learning. This means that students should be allowed to draw on their past experiences and their own schema of mathematical knowledge to solve new problems. As long as this process is monitored and teacher-led, it is important that students have the occasion to make discoveries for themselves in mathematics (i.e. deriving the quadratic formula, describing the surface area and volume of new shapes, or determining the properties of new functions).

Social Development

Vygotsky's theory of social development suggests that students learn in two steps: socially first, through discussion or oral interaction between peers and/or "more knowledgeable others"; and introspectively second, through practice or mental consolidation of new information. Students of mathematics should be engaged in some aspect of social learning, which adds another teaching style and another layer of repetition for the same new material (i.e. discussions in class, collaboration on problems/homework, or class-challenge questions as were shown in the Dan Meyer video from first term.)

Attribution Theory

The message behind Attribution Theory is that students should have an accurate benchmark for their learning progress, and should be encouraged to take responsibility for whatever outcome should arise on an evaluation. In order to develop fully, students need to realize a self-centred locus of control in their educational world. In teaching mathematics, this means that teachers should: set clear expectations for students on evaluations, give detailed feedback on how students made mistakes and how they can fix their mistakes in the future, and offer students multiple chances and outlets for seeking help if they need it.

Maslow's Hierarchy of Needs

The question answered by Maslow's Hierarchy of Needs is *why* learning is a natural intuition for humans. This theory states that if a person has established themselves at more fundamental levels (such as physiological and security needs), they can begin to develop higher-level needs (such as love/belonging and esteem). Once the hierarchy has been filled out, only one life-long step remains, and that is self-actualization, which means to work towards achieving one's life goals, and often begins with learning. The applications of this theory in education deal with a teacher creating a safe school and classroom atmosphere, and knowing how to help capable students who are struggling.

Bloom's Taxonomy

The premise here is that it is not enough to ask students to memorize facts and understand connections to give a student a complete education. Other features of a well-rounded education involve: The application of skills learned from the education process to new situation, the analysis and evaluation of work done by someone else (and themselves), and the ability to create new contributions to the subject area. In mathematics, this concept can be taken into account by giving many different types of questions on both in-class and practice questions, and on evaluations.